DISCUSSION OF THE CLAIMS

Claims 1-17 are active in the present application. Claims 13-17 are new claims. Support for new Claims 13-16 is found on page 14. Support for new Claim 17 is found in original Claim 9.

No new matter is added.

REMARKS

Applicants thank Examiner Johnson and the Examiner's Supervisor Mr. Jerry Lorengo for the helpful and courteous discussion of July 8, 2009. During the discussion Applicants' U.S. representative pointed out that the original specification includes factual evidence substantiating Applicants' claim to discovering a source of underperforming reactive sizes.

Applicants have disclosed and claimed an aqueous dispersion that provides substantial advantages over conventional aqueous dispersions used to size papers. The aqueous dispersion of the claimed invention includes a cationic polymer having vinylamine units. The cationic polymer acts as a protective colloid for a reactive size. Unlike conventional protective colloids, the protective colloid of the claimed invention contains no more than 0.0001% by weight of diketenes. Applicants have discovered the source of a problem that hinders sizing performance of reactive sizes and disclosed the solution to the problem in the present specification; namely, using a dispersion in which the protective colloid has no more than 0.0001% of diketene.

Applicants draw the Office's attention to MPEP §2141.02(III), reproduced in part below:

> "[A] patentable invention may lie in the discovery of the source of a problem even though the remedy may be obvious once the source of the problem is identified. This is part of the 'subject matter as a whole' which should always be considered in determining the obviousness of an invention under 35 U.S.C. § 103." *In re Sponnoble*, 405 F.2d 578, 585, 160 USPQ 237, 243 (CCPA 1969). However, "discovery of the cause of a problem . . does not always result in a patentable invention. . . . [A] different situation exists where the solution is obvious from prior art which contains the same solution for a similar problem." *In re Wiseman*, 596 F.2d 1019, 1022, 201 USPQ 658, 661 (CCPA 1979) (emphasis in original).
>
> In *In re Sponnoble*, the claim was directed to a plural compartment mixing vial wherein a center seal plug was placed

> between two compartments for temporarily isolating a liquid-containing compartment from a solids-containing compartment. The claim differed from the prior art in the selection of butyl rubber with a silicone coating as the plug material instead of natural rubber. The prior art recognized that leakage from the liquid to the solids compartment was a problem, and considered the problem to be a result of moisture passing around the center plug because of microscopic fissures inherently present in molded or blown glass. The court found the inventor discovered the cause of moisture transmission was through the center plug, and there was no teaching in the prior art which would suggest the necessity of selecting applicant's plug material which was more impervious to liquids than the natural rubber plug of the prior art.

Here, Applicants discovered the source of a problem relating to sizing performance. As explained below, Applicants provided factual evidence substantiating Applicants' discovery. Applicants submit that the discovery and disclosure of the source of a problem and its solution are probative of patentability in view of Applicants' factual evidence.

Applicants included factual evidence in the original specification to demonstrate that the presently claimed invention is substantially superior to generic aqueous dispersions of reactive sizes. The examples of the original specification compare the presently claimed invention with two conventional aqueous dispersions (i.e., the compositions described in WO 96/26318 and WO 98/41565 - see page 15 of the present specification).

Each of Inventive Dispersions 1-4 described on pages 14-15 include a cationic polymer having vinylamine units whereas Comparative Dispersions 1 and 2 use the N-vinylpyrrolidone and/or N-vinylimidazole polyethylenimine condensates of WO 96/26318 or the polymers of WO 98/41565 which contain, for example, polyamidoamines grafted with diketene-containing polyethylenimines (see page 1, lines 33-36 and page 2, lines 10-15 of the present specification). Applicants submit that the examples of the present specification prove that an aqueous dispersion that includes a reactive size and a protective colloid made from a vinyamine unit-containing cationic polymer that is essentially free of any diketenes is

substantially improved with respect to the conventional aqueous dispersions described in WO 96/26318 and WO 98/41565.

Examples showing that the aqueous dispersion of the present claims provides better sizing characteristics than conventional aqueous dispersions are described on pages 15-17 of the specification. Table 1 on page 16 shows that each of inventive Dispersions 1-4 has a substantially lower Cobb number and longer ink flotation time. The Cobb value is a measure of the wettability of a sized paper and ink flotation is a measure of the time in which an ink requires to strike-through (e.g., blot) a sized test paper (see Table 1 below).

TABLE 1

Test No.	Dispersion	[% by weight] stearyl-diketene, based on dry paper stock	Cobb 60 in g/m^2 immedi-ately	Cobb 60 in g/m^2 after 24 h	Ink flotation time after 24 h in min
1	Comp. dispersion 1	0.9	48	25	45
2	Comp. dispersion 2	0.9	45	25	46
3	Dispersion 1	0.9	32	24	50
4	Dispersion 2	0.9	34	23	55
5	Dispersion 3	0.9	37	24	55
6	Dispersion 4	0.9	30	22	60

Table 2 on page 17 of the specification and Table 3 on page 18 of the specification further show that the aqueous dispersion of the present claims provides sizing characteristics that are substantially improved with respect to Cobb value, ink flotation and edge penetration.

TABLE 2

Test No.	Dispersion	[% by weight] stearyldiketene, based on dry paper stock	Cobb 60 in g/m^2 after 24 h	Ink flotation time after 24 h in min
7	Comp. dispersion 1	1.3	42	33
8	Comp. dispersion 2	1.3	39	37
9	Dispersion 1	1.3	29	55
10	Dispersion 2	1.3	30	52
11	Dispersion 3	1.3	26	60
12	Dispersion 4	1.3	30	53

Applicants claimed invention includes a solution to the problem of underperforming sizes; namely, excluding ketenes from the protective colloid of the aqueous sizing dispersion.

Rejection under 35 U.S.C. §103

The Office rejected the previously presented claims as obvious over Downey (US 2,627,477) in view of Lenney (US 5,470,903). The Office asserts the following in support of the rejection:

> It would have been obvious to one of ordinary skill in the art at the time of the invention to utilize the poly(N-vinylformamide) taught by Lenney as the emulsifying agent in the aqueous sizing emulsion taught by Downey. This modification would be motivated by the teaching in Downey that any emulsifying agent may be used (column 1, lines 20-24), and the teaching in Lenney that the poly(N-vinylformamide) protective colloid is especially useful for producing monomer dispersions (column 2, lines 21-24).

See the second to the last paragraph on page 4 of the June 1, 2009 Office Action.

Applicants traverse the rejection in view of (i) the factual evidence of the original specification demonstrating that the presently claimed aqueous dispersion provides substantially improved performance, and (ii) the Office's improper extension of Lenney's teaching from monomer dispersions to reactive sizes.

As discussed above, Applicants demonstrated that the presently claimed aqueous dispersion provides sizing characteristics that are substantially improved in view of conventional, e.g., generic, aqueous dispersions. As acknowledged by the Office, Downey discloses that any emulsifying agent may be used to form certain dispersions. Applicants submit that one of ordinary skill in the art reading Downey, and following the Office's logic, would be led to believe that all that is necessary to form an aqueous dispersion is to include a generic emulsifying agent and that all emulsifying agents would have the same general properties. Applicants have disclosed, as discussed above, that using the particular cationic polymer containing vinylamine units recited in the present claims provides an aqueous dispersion that is able to function more effectively as a sizing agent. Applicants submit that those of ordinary skill in the art reading the cited disclosure would not have been able to foresee that such improved results are the consequence of the inclusion of the particular cationic polymer of the present claims in an aqueous dispersion.

Applicants request withdrawal of the rejection in view of Applicants' factual evidence rebutting the Office's assertion of obviousness.

The Office further asserts that Lenney discloses that a particular poly(N-vinylformamide) protective colloid is useful for stabilizing monomer dispersions. The Office failed to provide any explanation why one of ordinary skill in the art would believe that a dispersion of a reactive size would function in the same manner as a dispersion of a monomer that is undergoing emulsion polymerization. Applicants submit that Lenney does not motivate those of ordinary skill in the art to arrive at the presently claimed invention at least because Lenney, at best, suggests a combination that is different from the cationic polymer/reactive size combination of present Claim 13. Further, Lenney, as acknowledged by the Office, suggests stabilizing a monomer for the purpose of emulsion polymerization

whereas the present claims are drawn to an aqueous dispersion in which a protective colloid stabilizes a reactive size.

Applicants draw the Office's attention to the new dependent claims. One or more of the new dependent claims includes features similar to the features described for the aqueous dispersions and/or sizing agents described in the examples of the present specification.

For the reasons discussed above, Applicants request withdrawal of the rejection and the allowance of all now-pending claims.

Respectfully submitted,

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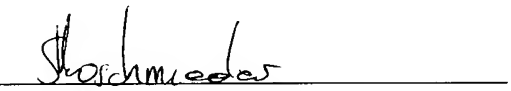

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